

**The Health Impact of Chemical Exposures
During the Gulf War:
A Research Planning Conference**

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***Plenary Sessions
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I want to start out just by making a few comments. I want to thank you all very much for being here. I don't know about you all, but I'm pretty tired. And I imagine you all are tired as well. I would especially like to thank the veterans for their input. I know a lot of veterans came a long distance to be here in order to share their experiences and their concerns with us, and to help us better understand their point of view. So, we very much appreciate it and we hope that it has been useful for you. I think it has been useful in terms of providing a forum for a dialogue between the veterans and the scientists. That's usually not an easy process, and I know it's been difficult for all people involved.

I'd also like to thank our various different speakers, and panel members, and workgroup members. I think they've made a, we've had a lot of important discussions, we've talked about a lot of things, and hopefully we've had some good interchanges. I'd especially like to thank our four workgroup chairs. I know that they have worked very hard. It's been a difficult process. We gave them a very tough task, and unfortunately I know that sometimes people were not happy with the process, but we had a goal in mind. We wanted to try to get some specific research recommendations. Sometimes that's a tough process and they had to be tough at times.

Sometimes we didn't get to hear from as many people as we would have wanted to, or to give people as much time as they would have wanted or thought would have been helpful.

I'd also like to thank the other members of the Executive Planning Committee. The planning of this conference was very much a group process. There were many different agencies within the Department of Health and Human Services that were involved. I'd just like to acknowledge Phil Talbot who is the Co-chair and my colleague, Pete Mazzella and Pat McNeilly who are from the Office of Public Health and Science in the Department of Health and Human Services, Donna Dean and Sheila Newton from National Institutes of Health, and Moiz Mumtaz from ATSDR. They all worked very hard on this effort.

So, what we'd like to do now is to give the four chairs the opportunity to review their research recommendations. I think the process we'll use will be to allow each chair to go through their recommendations and then have some time for questions. We'll leave some time after each speaker to allow a few questions on their recommendations. We won't have a lot of time because we want to make sure everybody is heard from, and that all four chairs get enough time. So, if you have questions that are in terms of clarification in addressing the specific research recommendations, and then after that, we'll open it up to a broader discussion and questions. And then we will close with some remarks from Dr. Henry Falk.

So, why don't we go ahead, and let's start with Dr. Wilson who was in workgroup I, the pathophysiology/etiology group. You need to speak into a microphone so we make sure we get you.

Barry Wilson, PhD

Professor

Department of Animal Sciences & Department of Environmental Toxicology

University of California, Davis

Davis, California

Good morning. Thank you, Dr. Barrett and members of the committee, members of my panel that I will show in a minute. First, I want to thank the veterans. I sat here for 3 hours a night ago, and it was unforgettable for me. I'm just a bench scientist. I try to work with committees or other scientists and we show off how smart our students are, how great our grants are. Yes, I am a medical scientist, but it's not often I get to see, and feel, and know the pain. I have. It's changed me, maybe not for the better, but it has colored all that I tried to do here. I want to thank you guys. If you need me, just call. Now let me start out.

Here is our committee of very distinguished scientists in different areas. Neurosciences all the way through behavior. Moiz went off to a different one. Sheila Newton, a scientist in her own right, has prepared, done everything, marvelous, okay? So, I want to especially thank her and, of

course, all the members of the committee for all they've done. If we had had an extra day, we could have brought you the commonality of research where people say, "Wow!" and come running out of the room. As it was, we've gotten to the end of a work-in-progress and I'm going to present it to you so you can see the areas that we think are important. But to bring it home, for the committee's benefit here in organizing, one more day and we would have done it. And it's been hard work now. Why, because what we've done and accomplished was not in a closed room. It was with all of you, not only watching, but coming in. Those that have been in my room know I tell you to shut up, you can't talk, and you take the microphone anyway, and we would talk together. And they would help me, and some of the guys, their ideas are in what I'm going to present. And it worked. The dynamic was different, but it worked, and I hope that everybody felt they had, not enough time, but they had a chance to put across what they wanted. That's above and beyond all the work that I'm going to show you.

Our charge as the research panel was to address the pathophysiology. Essentially, we were there to design the research to find out what happened, how it happened inside your bodies, and at the end of the line – what do we do about it? There were specific areas that we were charged with to look at - synergistic effects of chemicals, how 1 and 1 doesn't equal 2, it equals 3 or it equals zero as they get interactions; subclinical effects, meaning you can lose almost half of your muscle capacity and never know it until you try to run a marathon; susceptibility, biomarkers of these, meaning early warning signs; and study methods. The purpose I laid out at the start was sort of simple. I wanted us to look towards the future as well as the past. I wanted us to have our feet firmly based in past experiences, not just past research. And our role was to identify the knowledge gaps, find ways to fill and justify the research in terms of the veteran at all times, list unfulfilled directions, reduce the list, re-group, prioritize. It's a work in progress. For prioritizing, we didn't quite get to that, though we have a suggestion here. And now we've got the report.

At the start, some of the criteria, it's very simple up here. The best science, testable hypotheses, if wishing would make it so, we'd all be Nobel Prize winners around my panel, relevance and addressing what we really don't know, avoiding undue duplication. That was hard to do because that was one of our recommendations, you see, I want to have that screened. Look to clinical mixtures, always the key. No, I'm jumping out of some of the things. I want to do a quick bit of teaching for all of you. When you think about the studies in science, we're all specialists in one area from molecule to cell, the organ, the animal, the population. We all work in molecules, cell, organ, to population. If you only study on the one level, you're doing description. You don't have a mechanism. You don't have a significance. You've got to do at least 2 levels, multi-level research. Now we're talking multi-chemicals, multi-people. This, indeed, is a multiplication conference.

Before I go into our research group's, led by Dr. Spencer, we have worked out what is a preamble. Some of this is controversial. To us, as health scientists, we stand by it. I am going to

read it because we went over it this morning, and the words that folks have agreed to. This is not my usual style. I flat out ad lib.

The objectives are to:

- ' Identify the events or environmental agents precipitating Gulf War illnesses;
- ' Identify the biochemical and physiologic basis of Gulf War veterans' symptoms;
- ' Identify the mechanisms leading from exposure to symptoms; and
- ' Establish the scientific basis for treatment strategies for Gulf War illnesses.

The synthesis of part of these objectives came from one of the scientists that was listening in the audience. This was truly a 2-way street as we worked. Now, the draft document is still a work in progress always:

The framework for a national agenda of research on illness among Gulf War veterans was originally developed in 1994 by non-governmental medical scientists at an NIH Consensus Conference. In subsequent years, additional recommendations were made by various non-governmental committees, notably, the Presidential Advisory Committee and the Institute of Medicine. These inputs have been used by the federal Persian Gulf Veterans' Coordinating Board to develop and implement a national research agenda.

The present research recommendations are built on this foundation. However, they arise primarily from the combined input of veterans and non-governmental medical scientists. The recommendations are intended to provide an additional source of considered judgement on an appropriate research agenda that responses to current and future health needs of U.S. Gulf War veterans.

It is recognized there is overlap between the present research recommendations and those made by previous groups. Moreover, a significant portfolio of research is already underway and the fruits of this investment are only now beginning to appear. Some earlier research recommendations may not have always been followed. The present list of recommendations is the best current estimate of areas that merit research investment, whether ongoing or yet to commence. It will be necessary to compare this list with previous recommendations and on going research to determine areas that are newly identified. We did not have the time nor the availability to get all the stacks of what is going on now as we came up with the important areas. That is one way we failed our charge, but we did the best we could. Prioritization of research among existing and newly identified areas must take into account limitations of available funding, and the pressing need to obtain scientifically sound answers to address the health needs of veterans at the earliest

possible time. There's our priority for short-term work. Right there. We need that.

An overarching theme that arises from these recommendations is the synergy and benefits that result from interactive research among medical and basic research scientists and veterans. To maximize the chances for success, it is imperative that scientists listen to the experiences of the veterans and attend to their needs. It is also of critical importance that veterans encourage and support research directions reached by this consensus. The research agenda, whenever possible, should be interdisciplinary for the combined activity of the basic and clinical scientist is required to move from the bedside to the bench, and from the bench to the bedside.

The workgroup feels strongly that research should be focused on unifying mechanisms that have the potential to explain the multi-system symptoms of Gulf War veterans. Now, if we just stopped there, we would be giving you a problem. We're giving some administrative solutions, too, before we launch into our list of research.

To insure and enhance continuation of the present cooperation between health professionals and veterans, it is recommended that a non-governmental national committee be established to advise on the selection and implementation of these research recommendations. This is not intended to replace the governmental interagency Research Working Group. I know, on everybody's faces, "Oh God, another committee, down here." Rather, it's to provide a mechanism by which the interests of Gulf War veterans can be heard on a continuing basis by a non-governmental group. We then discussed how to do this specifically. We had a few alternatives. A possible venue for this committee is the National Research Council, which is a non-governmental body with a reputation for independence, with joint participation among the National Academy of Sciences Board of Toxicology and Environmental Health Hazards; the Institute of Medicine including the Medical Follow-up Agency; and representatives of Gulf War veterans' organizations. Alternatively, a federally sanctioned committee could be established whereby representation from the various interested parties would be mandated. This committee would be modeled on the advisory group that provides oversight to the Superfund Hazardous Substances Basic Research and Training Committee. Seems to me the veterans are just as super as any Superfund. That's an ad lib, that's not in here.

The United States, here's another, I want you to think. We are all medical scientists here. We are worried about the health and to find out as much as we possibly can so we can deal with the health of our veterans. The United States took the lead in activating research on Gulf War veterans illnesses and was later joined by other countries within the coalition. Early opportunities for international collaboration were missed. There is little information on country-specific prevalence of unexplained illnesses among veterans, and why such illnesses were not reported by some coalition partners. Little or no research has been undertaken among the communities directly impacted by the Gulf War conflict, and no international public health research has been carried out in Iraq. For a clear picture of the relationship between the adverse health effects of

environmental exposures in the theater of war, it is imperative every conceivable opportunity be taken to collect and synthesize relevant exposure and health information from other nations, including both allied countries and Iraq. Because veterans of all countries participating the Gulf War sustained exposures of concern, there really is no scientific basis for the exclusion of one party from the study. We hold our hand out. It's the health of our guys we want to worry about. The medical doors of countries involved in Gulf War contract now appear to be opening to international medical scientists committed to finding answers to common health problems. We had a big argument about how open, or whether it's closing, or ajar, or what. Maybe this is just how we'd like it to be. Credible evidence of a rare disorder occurring in high incidence among Iraqi veterans could greatly impact the understanding of comparable illnesses among veterans of coalition forces. What we're saying guys is that, the more numbers you can get into your study, the more you can find those low incident cases that are so important because they hurt so badly.

To explore the most plausible etiological hypothesis concerning diagnosis, diseases, and unexplained multiple symptom illnesses noted among Gulf War veterans, the workgroup calls for multi-disciplinary research efforts. The research recommendations include a mixture of short-term goals of immediate relevance to the understanding and treating Gulf War unexplained illnesses, and longer-term goals that will build the foundation to prevent and understand environmental disorders in future generations. We might have, who know when the next trouble comes? It may not be future generations. It may be here and now. The immediate needs are important and pressing, but the value of investing a portion of available research dollars into new methodologies cannot be overemphasized. Chemical and biological weapons have emerged from anecdotes in the history of human warfare to become pressing, current environmental hazards in both military and civilian sectors. The importance of research on mechanism of action, short-term and long-term adverse health effects of acute, low level, and sub-lethal exposures has been recently recognized and needs to be followed up.

Now, the research. This diagram upside down, inside out, still is, hey I don't have any stress syndrome. Stop. I've got it. It took a psychiatrist to help me out of this. Okay. This is Sheila Newton's drawing of Dr. Iris Bell's very, very nice diagram of all the things that we're talking about and maybe a few of them are even left out. Okay? There'll be no quiz. I'm not going to talk about it. And although I was teasing her all along, I am going to give it back to her. It's a really great diagram. But we've tried to block them out into bullets that would be easier than to show all the interactions. Just remember, when you go from molecule to the environment and all the people in between, all those levels defy even the new PCs to get all the nice little matrixes out. I know. Several of us tried. So, with no apologies, I've already given you the whimpering at the start about what we tried to do. There's a list of different areas. First are the environmental exposures and the time course. And these range from, and I'm not going to cover them all in detail. How much time do I have? Pardon? Another 5 minutes. This deals with environmental exposures and their time course. Here there is a list, and an important one, of what we think could well be the environmental factors that face the interactions. Sorting them out, nailing them

down, studying them in ways we can understand takes us beyond the bounds of the mechanism sciences that we have. Multiple chemical studies is very important and it's going to take some sorting out to pick out which one goes now, which one goes later.

Second then, you go from the environment down to the human. And there we have things like the analysis of the deployment, comparing different cohorts of people that were here and not there, went here, some who didn't go there. Looking at the populations, looking at the neurological problems and the muscular problems in the aging, the immunological studies, pulmonary, circulatory, dermal, other organ systems, birth defects. Though it's been said they're not there, lots of guys think they are. We don't close that door. The chemical sensitivity. Gender effects, which should take a big priority. Treatment driven research strategies. Remember, these are not prioritized.

Next, I know some of you vets the other night said, "Hey, come on, study us." Some of the things we're not going to do on you. There's been enough done to you already. Okay? We do it on experimental animals looking at synergistic effects, subclinical effects, low-level, multi-generational, the gene expressions that you heard Dr. Soreq present. The critical manner of the delayed expression of something happens at time T and all of a sudden, 2 years later, or in the studies I do in oranophosphates, delayed neuropathies appear. Sex differences, again.

The development of biomarkers, those early warning signs for chemical sensitivity, for stress, for chemical agent exposures.

New methodologies. Looking at molecular interactions by analyzing the chemical structures and comparing their effects. This is a well-worked, well-known, powerful field. Multi-factoral statistical models. Let's go from gene/environment interactions all the way to look at what could confound the study because there's been some exposure out there. There is nothing so bad for us as the laws of unintended consequences and of forgetting something that you get blind sided with when you do a field study. Field studies are not like you can do in the lab. New techniques of imaging techniques. Anti-sense DNA technologies. And alternatives to animal systems. Lots of people, we don't always want to study animals, there's much we can do on cell culture level.

Related exposure-driven studies. What are the potential health effects of the destruction of chemical warfare agents in the U.S.? The Gulf War is not over and the kind of things that could happen may be going on right now. Pesticide exposures. Oil fire exposures.

Lastly, specialized needs. One marvelous suggestion of one of the veterans was a centralized Gulf War research library and data repository with electronic access. We're solidly behind that. It's a great idea. The other is to do controlled-environment medical research units where people in isolation can be studied and we can look at what's happening, and we can look at detoxification.

That's our finality of our reports. Our priorities are to those multi-disciplinary research, to what will be the most meaningful to help the soldier. Giving us another day, we would have had the "Wow" experiments that we would have come out with. Every committee has done their very, very best and I thank them, and I thank all of you.

Dr. Drue Barrett, Moderator

All right. If we can take a few minutes for some short questions so that we can make sure that all the other chairs have their time to give their input. If you can, any questions? Well, then let's move on to the next one. Dr. White will now discuss the assessment and diagnosis recommendations.

***Roberta White, PhD
Director, Boston Environmental Hazards Center
VA Medical Center
Boston, Massachusetts***

I would like to reiterate Barry's thanks to the veterans. And I would like to thank the veterans here as well as all of the veterans with whom I've been working since the end of the Gulf War who have both given me my interest in this area, and have allowed us in Boston to do studies, and to try to figure out what's going on. I would like to acknowledge the work of the assessment and diagnosis workgroup. Pat McNeilly and Moiz Mumtaz, that's Moiz, where's Pat, he left, were our facilitators. And I'd like the workgroup members to stand up as I say their names. Happy Araneta is an expert on reproductive hazards. Is she here, Happy? Larry Bradley, an expert on Immunology. Albert Donnay, MCS advocacy. Gary Gackstetter, who is an infectious disease expert. Bob Haley, epidemiologist. Jim Cone, occupational health specialist. Thanks, Jim. Howard Kipen, also an environmental epidemiologist. Linda McCauley, from the Oregon Environmental Health Sciences University and a specialist in environmental toxicology. Karen Schmaling, a psychologist with expertise in CFS. Ed Shorter, an expert on psychosomatic illnesses. Terry Spittler, who is an expert on pesticide effects. Bob Vogt has left I believe. And then there is myself. I would also really like to acknowledge our audience. Our audience was very participatory and provided lots of suggestions, and many of the things that we're going to provide in the recommendations came from the audience. If our audience members could stand up. Are you too shy to stand up? Thanks for your patience also. It was a very difficult process being able to listen to everyone and debate everything out given the magnitude of the charge given to the group.

We actually had 7 topics on which to make recommendations and we're going to talk about each of those topics. We will be providing an introduction to our report, sort of of the nature that Barry talked about, but a little bit, but very politically sort of focused, and coming a lot from our audience as well as our panel. Our audience suggested that nationally organized focus groups,

consisting of Gulf War veterans and facilitators, be encouraged to continue to funnel research recommendations to the scientific community and the agencies.

We were also very concerned in our group about the urgency of the problem for veterans. It's been a very long time, and there are many compensation and treatment issues that seem to be awaiting research findings. And, Jim Cone from our group wrote a statement that will appear in our introduction that basically stating that Gulf War veterans were chosen to be in better health than the general population, and are presumed to have been healthy before they were deployed. They were exposed to a combination of wartime conditions and environmental factors that are known to have risks for affecting health. In other occupational groups such as firefighters, police and miners who have exposures to complex environmental hazards, it's often recognized that these things affect health. An interim assumption has to be established for veterans pending better characterization of the illness so that they can get treatment and compensation, and so these ideas will not interfere with what is actually going on.

There was also concern in our group about exposure assessment which was not one of our topics, and particularly DU exposure assessment, and there was further concern in our group that the multi-system chronic illnesses that I'm going to talk about . . . recommendations for studying in a minute, will be diagnosable so that Gulf War veterans can receive compensation for the disorders. That's just sort of a general background introduction to our actual research recommendations.

The first in the topic that we were asked to deal with in our group was case definition. A lot of our research recommendations are methodological and some of them are not new. Scientists cannot help but insist on sound methodology when they make recommendations. It seems to be built into our blood. So, some of the things you will see on recommendations are not new, and they're methodological. Some are being done but we wanted to emphasize the importance of them, and others are new directions. Within the case definition, we felt it was important to establish a process by which case definitions can be developed for symptom-based illnesses such as Persian Gulf War illness, and that this case definition or set of case definitions for PGWI, be compared with existing definitions of disorders such as multiple chemical sensitivity, fibromyalgia syndrome, chronic fatigue syndrome, and other disorders, and we felt that this is a short-term goal.

We felt that it was important to delineate the definitions of Persian Gulf illness that are implicit in existing studies such as the studies being done at the VA Environmental Hazards Centers, the CDC study, and Bob Haley's study. There are others, I'm sorry they're not all mentioned on here, and that we compare methods of diagnostic determination in these studies. We also felt that it was important to define the subtypes of Persian Gulf-related illnesses that can be known using existing data, and this would have to be a long-term goal as we find out more about the problems of specific veterans. We also felt that it was important not to lose track of individual symptoms and symptom clusters that cannot be subsumed under these diagnoses. So, we don't want to just

deal with diagnoses, we want to look at the relationship between symptoms and symptom clusters and exposures and other variables, and so we felt it was important to keep track of that on a long-term basis.

Our second topic was chronic multi-system Disorders. Our first recommendation was for comparison of the prevalence and overlap of several different conditions, such as Persian Gulf War illness, chronic fatigue syndrome, fibromyalgia, multiple chemical sensitivities, somatization, sick building syndrome, PTSD, neurasthenia, and you could probably think of other disorders in Persian Gulf veterans, to the prevalence in other relevant populations. Some of the populations we are interested in are Persian Gulf-area indigenous populations, coalition forces, active duty personnel, prep for deployment, Russian liquidators who worked at Chernobyl, and other relevant populations. We wanted to reiterate that it's important to carry out case controls among PGW Veterans. So that's already been done. And we called for examination of field data on casualties and illnesses in the war theater. Some of this has not been made available to us.

We also recommended the use of laboratory models to explore illnesses and symptoms experienced by PGW veterans, novel techniques such as environmental control units, application of imaging and functional imaging techniques, such as PET, SPECT, functional MRI, development of models of neurologic disorders without peripheral nervous system damage, and studies of exposed populations, some of which Barry mentioned, which were particularly encouraged. A member of the group advocated a list of markers, especially mast cells and oxygenase as examples of things that could be studied. Animal models of PGW-related disorders should also be pursued. These include study of polymorphisms that mediate exposure effects and animal strains bred to express relevant symptomatology. We also recommended investigation of barriers preventing VA physicians from applying the diagnoses of these disorders to patients, study of the reliability of application of these diagnoses in the VA to VA patients, and the potential for training physicians how to apply the diagnoses. One group member also recommended a specific type of diagnosis as a baseline for chemical diagnosis for MCS.

The third topic, well-defined disorders, is simply a methodological group of recommendations on how disorders that have long had diagnostic criteria, should be handled. The recommendation was made that medical disorders be classified by ICD-9 criteria, that psychiatric diagnoses use Diagnostic and Statistical Manual criteria, that adverse reproductive outcomes be classified with CDC classification, that cancer diagnoses be made according to SEER-recognized classifications, that studies record the existence of disorders such as physical trauma, infectious diseases, autoimmune disorders, vocal chord dysfunction, asthma, rhinitis and mortality, and that all diagnoses for research purposes employ gold standard evaluations. There was also a recommendation for looking at a number of ICD-9 conditions that might be provoked by exposure to chemicals when evaluating for MCS symptomatology.

The next topic was overlap of conditions. The first statement that we made was that when

investigators assess overlapping conditions, they must define the exclusionary criteria used for labeling subjects with each condition, operationalize, that is, define in concrete terms, the definition of the condition, and use standard criteria for diagnosing the condition, whenever possible, including concrete statements about how the criteria were measured. So, not only do you use the criteria in the literature, but you say how you measured those criteria. We wanted to evaluate the overlap between specific chronic multi-system conditions and other such conditions as well as well-defined conditions. So, the overlap between one multi-system condition and other multi-system conditions, as well as one multi-system condition and well-defined conditions. Investigators must develop and specify the methods by which they handle overlap in symptoms and overlap in diagnoses in looking at their data. It's necessary to explore determinants of patient treatment-seeking. Do they affect the characteristics of study populations when treatment-seeking patients are the subjects?

We also thought it would be important to explore the characteristics of patients seeking care at different types of healthcare facilities. So, studying VA patients may be inherently different than studying patients who go to various types of private facilities. We also felt it was important to examine the existence of relationships between pre-existing disorders, before people went to the Gulf, both of a well-defined nature and in terms of chronic multi-system disorders and the expression of chronic multi-system disorders after Persian Gulf service. We also were interested in the role of gender in the development of disorders in PGW veterans. There is a higher rate of some conditions among males in the PGW veteran population, than in some other populations. This was also mentioned by Barry's group.

Our next topic was biomarkers. We felt that identification of biomarkers is necessary for comparison of PGW-related disorders to other disorders, identification of genetic polymorphisms for susceptibility to disorders and for definitive diagnosis of disorders. We wanted to develop biomarkers that would tell us about past toxicant exposures. This would be incredibly helpful in our research, if we could identify what people have been exposed to, since we don't have other measures, and we recommended studying existing biomarkers and performing new research on existing biomarkers for single disorders and for combinations of chronic multi-system disorders.

Our sixth topic was assessment and diagnosis. This is a very large group of recommendations. It's the title of our group and a lot of us are assessment people. Our first recommendation was for assessment techniques employed in research should reflect specific hypotheses about relationships between chemical exposures and structural changes or functional abnormalities. This means we don't just throw assessment techniques at people. We have hypotheses about which tests are going to show effects and which tests aren't. Behavioral or physiological challenge studies were recommended that would allow expression of pathology in well compensated subjects. Development of new laboratory tests of chemical effects is recommended. Studies should include evaluation of reliability, repeatability, validity and specificity of these tests. Combinations of assessment and diagnostic techniques aimed at evaluation of the same organ

structure should be employed in research. For example, a study of the CNS might include structural imaging, neuropsychological testing, neurophysiological measures, and functional imaging to see if we can get some concurrence of what the findings are. Comprehensive assessment may be required to accurately measure variables of interest, to evaluate confounders, and to assess the same domains in different ways. Clinically non-routine assessment probes are recommended for consideration in research such as environmental control units, carbon dioxide challenges, blind olfactory challenges, autonomic nervous system assessment, and response to treatment. Use of tests for which there are normative and validated data for the general U.S. population or carefully matched control groups, is recommended. A research project assessing longitudinal health changes across time in a normal population, is suggested. One panel member recommended medication history – taking assessment on all subjects. Assessment of family members and significant others is recommended for independent verification of partner health outcome and risk factors, in order to ascertain whether there is a biological basis for symptom transmission, and in order to explore environmental exposure histories at home. Assessment of events following the death of Persian Gulf veterans is suggested, in order to track factors that might lie behind the death and the death certificate diagnosis that might not be immediately obvious. And finally, a recommendation was made for protocol-driven autopsy studies following the death of Persian Gulf veterans.

Our seventh topic was validation. Our first recommendation was identification of appropriate populations for validation and cross-validation of study results on PGW populations. We should consider groups deployed elsewhere, non-deployed and other exposed populations. Military controls may not always be appropriate because they may have had the same exposures as deployed veterans. Standardized instruments that have been revised for Persian Gulf populations need to be re-validated. The use of convenient samples in order to develop hypotheses about Persian Gulf War-related disorders is appropriate if one retests on a larger representative sample when provocative results are obtained. The validation of the case definition can be carried out at three levels. This is from the lowest to the highest level: Derivation on a single PGW population, replication in a second population from findings in a first population, and association of the findings with appropriate biomarkers.

We made one final, general recommendation. This we did at the end of our meeting today, but group members felt that the DoD must de-classify and disseminate all classified or suppressed scientific field investigations and clinical studies that would allow us to understand Persian Gulf veteran illnesses and their possible causes.

Dr. Drue Barrett, Moderator

We'll take a couple of questions if you can please keep it somewhat brief, so that we have time for everyone.

Discussion

***Albert Donnay, MHS
Director, MCS Referral and Resources
Baltimore, Maryland***

Thank you. I'm the panel member to whom all those "one member" recommendations refers to. I'm very concerned that, while we were discussing this this morning, what you saw right there on the screen was rejected by myself and others as inappropriate, and Dr. White asked me to re-write my specific recommendations, telling me that they would still be identified as only my recommendations. I submitted to her a piece of paper with those re-written recommendations. Do you still have that, Dr. White, and could you please read into the record the recommendations, as re-written, instead of the ones that were shown on the screen?

Dr. Roberta White

Albert, I thought one of them went into the introductory section and that was the one that I read, I didn't read the whole recommendation.

Mr. Albert Donnay

Could you please read the two, there's only two recommendations on that list. The third one was crossed out.

Dr. Roberta White

I see three. Was that the one, "researchers define MCS according to fully operational criteria," was that the one?

Mr. Albert Donnay

The panel decided not to include that.

Dr. Roberta White

"Recommend any research into MCS consider the overlap with other well-defined ICD-9 disorders who's signs and/or symptoms are also known to be associated with chemical exposure such as asthma, mastocytosis and disorders of porphyria metabolism?"

Mr. Albert Donnay

Yes, that should replace the first one you attributed anonymously to me, which suggested that I was recommending research into a list of markers including mast cell and hemoxygenase. I did not recommend hemoxygenase assays. That's quite complicated. I was specifically mentioning the ones you just mentioned. I also was identified there as a member who recommended clinical criteria for the diagnosis of MCS in clinical settings. I felt very strongly that this was a research recommendation, because research into these disorders, if it ever does prove fruitful, will need to be applied to the population who has these disorders, and until DoD and VA start diagnosing and tracking CFS, FMS and MCS, those patients will not be able to benefit from this research. Furthermore, although our workgroup did support doing whatever we could to help move veterans forward in their quest for treatment, wherever they could get it, and compensation. I was the only one who supported the need for making these diagnoses so they can proceed to find treatment and compensation for specific disorders, and I would ask that you clarify that, as well.

Dr. Drue Barrett, Moderator

Can I ask you, Albert, to wrap up your comments because we want to give some other people . . .

Mr. Albert Donnay

I want to correct the ones that are specifically attributed to me. It was also suggested in the list that I suggested screening for 60 disorders which are also associated with chemical exposures. That was rejected by the committee and I re-wrote it specifically to suggest that we should be screening for, evaluating any disorder. I didn't specify the 60 whose symptoms are also associated with chemical exposure. And lastly, while it was true I was the one member who recommended screening for medication history and controlling for that in research studies, I just want to express my extreme disappointment with the other members of this workgroup. There were thirteen members and only five had any personal experience with diagnosing any of these disorders, and none of them were willing to support any of these recommendations.

Dr. Roberta White

Albert, if you would just give me the specific ones, that would be helpful.

***Douglas Rokke, PhD
Assistant Professor
Jacksonville State University
Jacksonville, Alabama***

I'm a Vietnam and a Persian Gulf War veteran and I was the health physicist responsible for depleted uranium in the Gulf. Current procedures call for the use of urinalysis to detect and

determine exposure to depleted uranium, however, the literature indicates that after a short period of time – 30, 60, 90 days – the effectiveness of urinalysis to determine depleted uranium or uranium in the body, is very limited. I would like to recommend that a research proposal be put in, a research taken to determine an effective diagnosis and assessment technique to determine at a late date, such as we are now, eight years, whether or not an individual was exposed to depleted uranium, and then determine what type of health effects may occur.

Vinh Cam, PhD
Presidential Special Oversight Board for DoD Investigations
of Gulf War Chemical and Biological Incidents
Greenwich, Connecticut

I understand there is a concern here that some recommendations did not make it to the final list. For whatever reason, I recommend that you put an appendix listing these items so that other people could have a chance to look at them. Thank you.

Ruth G. McGill, MD
Psychiatrist
San Angelo, Texas

Nothing is certain but death and taxes. Our hackers among the veterans, we have about 200 former members of defense intelligence, have hacked out about 10,000 deaths since the Gulf War, among those that were deployed. This death rate is somewhere between 5 and 10 times higher than the death rate for the state of Texas. What is a CDC convention doing without knowing the definitive death rate after eight years of this? I congratulate the assessment panel for requesting the death certificates and the autopsies and I insist, I demand, that we have all of the names, names, names of the dead, because numbers can be falsified, but with names, the families can come forward and say, “Our member died after serving in the Gulf War and his name is not on the list, and we want to know why.” Thank you.

Venus Valery Hammack
Womens Liaison
North Shore Veterans’ Counseling Services
Lynn, Massachusetts

I would like to respond to certain statements that were either misleading, or I felt were emissions by the assessment panel. One statement began with, “Other relevant populations without peripheral nervous system damage.” I feel that without including the population that have peripheral damage, which many Gulf War veterans that I know have that complaint, it will be overlooked. So, I ask that either with and without peripheral damage, both, at least, with peripheral damage, be addressed. And the second comment is in your last paragraph that begins

with “Assessment,” the second sub-statement in there starts with, “The behavior of psychological tests, of psychological assessment,” and what I feel is that too often it is looked as a behavioral as well as a psychological problem, and I believe that to bring that paragraph up so quickly that it puts in the mind of the reader that those problems are of greater concern, are of a more relevant issue, that will be focused on more, before you go on to laboratory tests. So, I ask that maybe you move that paragraph to another location in the document. Thank you.

Dr. Drue Barrett, Moderator

We’ll take one more question. We’ll have some more time at the end, unless both of your questions are short we can try to take both of them.

***Denise Figueroa, RN, BSN
Hospice Northeast Florida
Middleburg, Florida***

I just have a comment. I’m a registered nurse and a Gulf War veteran. I was stationed with the 312th Evacuation Hospital, located 17 miles from Iraq, 13 miles from Kuwait, near Log Base Echo. During a period of less than three months, we treated just about 12,000 casualties. U.S., British troops, hundreds of Iraqi prisoners of war, Iraqi civilians, including men, women, children, sometimes entire families who were choppered in after Hussein tried to squelch the uprising in Southern Iraq. I work for Hospice Northeast Florida and I also teach at Florida Community College. I can only do each on a part-time basis, because I had extreme lifestyle changes, weakness, fatigue, everything we’ve heard here from the veterans. My symptoms, I would say, are like the patients’ that I treat with multiple myeloma, when they state, “My muscles feel like they’re being pulled away from my bones.”

In ‘93, I began a qualitative study for the University of Florida, regarding experiences of nurses in the Persian Gulf War. I was met with skepticism by both the medical and the nursing faculty there, in part, because the study was qualitative and not quantitative, and because no one, at the time, even really seemed to believe that the Gulf War existed. I decided to simply tell my story in a book after that, and it was not necessarily a scholarly endeavor, at that time. I do agree that critical, quantitative, statistical research in putting all of this puzzle together is important. My charge to the scientists, the research people here, and I think I’m speaking on the part of the veterans, is to continue the research, but not to neglect the qualitative aspect of this research. Go to the veterans, one-to-one, ask open-ended questions, listen and actually hear what they have to say, then proceed with the painstaking process of evaluating the information you acquire. This is where effective treatment and prevention modalities will emerge. As Paul Sullivan said at the beginning of the conference, “We, the Gulf War veterans, are the evidence.” Thank you.

Damacio Lopez, BS

***Research Director
Re-Visioning New Mexico
Bernalillo, New Mexico***

I'm the research director of Re-Visioning New Mexico, and I ask that when you look into the depleted uranium exposures, that you not delete the radioactive element of that weapon. Thank you.

***Denise Nichols, MS
Vice Chair, National Vietnam and Gulf War Veterans' Coalition
President/Founder, Desert Storm Veterans of the Rocky Mountains
Wheat Ridge, Colorado***

I'm not sure where it fits in, but the thing I brought up about people, that their livelihood – be it nurse, doctor, pilot, truck driver – that affects other people's lives – law enforcement officers, that are veterans. We need to put in somewhere here, assessment, diagnosis, I don't know where, but we need a triage system for the critically ill. And we've got to get that in somewhere.

Dr. Drue Barrett, Moderator

Thank you. Can we move on to the other groups? And then we'll have some time at the end. Thank you. Alright. Dr. Natelson, with the treatment group.

***Benjamin Natelson, MD
Professor, Department of Neuroscience
New Jersey Medical School
East Orange, New Jersey***

My job, as the chairperson of the treatment workshop, was a difficult one in that we started the workshop with diverse ideas in three places. We were on three separate pages. The workshop was not all on the same page, and the audience was certainly on a different page. I think I can speak with surety when I say that by the end of the workshop, we were all on the same page, and that's the major piece of progress that I want to bring to you, and that was comforting. The other major piece, therefore, the other piece that I wanted to tell you, is that we all, the workshop that I led, was not just the panel. It was really the panel and the audience because we just blurred the lines between the audience and the panel, and we were all empaneled and empowered to try and get an answer here. The final sort of general point is that all of us in this enlarged panel, view what we have done in the course of the few days, as a skeleton with muscle and fat on it, but no flesh. That is to say, there are a lot of "I"'s to be dotted and "T"'s to be crossed. But, with that in mind, I think we have indeed achieved the goals which we set out to do.

Let me just review with you what our charge was. Our charge was to develop short-term, which is now, or certainly the next six months, and longer-term strategies to bring new treatments to bear to improve the health of all Gulf veterans. We were empaneled to try to maintain appropriate study methods. The second major aim was to develop ways to educate physicians and all other health care professionals to understand the needs of the Gulf veterans. So that, in a nutshell, was what we were all about. That's a lot of charge, so what I took the liberty of doing, was break our panel into four, sort of, subpanels, and when I get to each of those, I will tell you the composition of the people who were involved on the panel themselves, but once again, this was very interactive. The entire workshop was able to move forward with the help of Ed Kilbourne and Mitch Wolfe, who were very important in facilitating things.

Now, we have an overall sort of statement, and that is, there really is an urgent need for treatment, and that the review process needs to be expedited and less stringent. All of us knew that the sort of treatments we were putting together, even in the long-term, were treatments that might not get through an NIH peer review panel, and yet, are targeted and important. So, that's number one.

An obvious second point is, if an alternative cause or treatment is found for at least some veterans with Gulf War illness, then all veterans would be screened for these conditions and treated appropriately. So what that would mean is that Gulf War illness would become a narrower and narrower pie as causes were understood and veterans were appropriately treated.

Now, the first group that put their heads together was one that identified themselves as the macro. The macro group was led by Dr. Stu Brooks, with Drs. Nancy Fiedler and Leslie Israel. The macro approach is to establish a central body, logistic and communication network center, and the acronym of "LOK-N," to coordinate communication, education and outreach efforts necessary for effective conduct of treatment trials and research programs for Gulf War-related illness. Furthermore, LOK-N will facilitate communication channels between veterans, VA Gulf War coordinators, VA healthcare professionals, researchers and administrators. So, this is what we mean by Macro. This is the big overview of how to tie it all together.

Now, in terms of the short-term goal, the first step is to establish LOK-N that consists of all appropriate parties, researchers, healthcare providers, veterans, VA Gulf War coordinators, members of advocacy groups, etc., committed to enhanced communication channels between veterans, VA healthcare professionals, researchers and administrators. So, the target then, would be to establish organizational structure and members of LOK-N. This is the short-term. This is what can be done quickly. Establish goals and aims, establish a central data bank of completed or on-going research treatment protocols, establish a website or newsletter, and develop a needs assessment survey. And you're going to hear that that plays a role in some of the other deliberations of the panel.

The longer-term ideas are to develop educational tools that veterans, family, healthcare professionals and administrators can use to be educated. So, in other words, develop the tools and then apply them to those populations, veterans, family, etc., so that everyone is empowered by knowledge. Next, develop effective occupation, environmental, toxicological expertise for the VA and community healthcare providers. Lastly, establish informational communication channels between VA healthcare providers, researchers, veterans, administrators, Gulf War coordinators, etc. So, that's the first piece. That's the broad brush, and the umbrella that we thought was necessary in order to move research ahead.

The next group was a group that asked how non-pharmacological approaches could be used and how we could move forward. That group was led by Dr. Chuck Engel, with Drs. Anne Solomon and Michael Sharpe involved also. The challenge here is simple. We all thought that the current structure of VA and DoD care does not accommodate non-pharmacological strategies well. The panel's response to that is to alter the structural organization of services. In other words, take the box and rebuild it. These were the short-term solutions suggested. Number one, population-based needs assessment. We thought that would be aimed at all the veterans of the Gulf War. We would then use that to determine whether the Gulf veterans had needs for information, information capabilities, and that could be done via the computer, the Internet, telephone calls, mail, etc.

Number two is to determine what the health needs of the veterans are, via similar assessment. In other words, ask the veteran his or her health needs also, to get the veteran into the equation. Number two, self-help literature, targeting the vet's needs. So, the vet tells us the needs, then we develop the literature, and we would develop a group with standard self-help literature and we could compare it to a group with specifically tailored literature, so that would give us, in the short-term way, a sense of what is more effective in educating, general or focused.

Lastly, use a primary care or a collaborative primary care sort of approach. That would allow us to empower the vets based on their need, and to use primary care practice teams. The fourth would then be, an intensive multi-disciplinary care program for chronic symptoms and disability. Here, the point is that the exercise behavioral trial is currently underway, and the VA would be encouraged to have other demonstration projects that would then bring new treatment possibilities into the equation and use other approaches which would then be evidence-based. The outcomes for these trials would be, for these trials, and the outcomes are really fairly constant across all of our suggested treatments - veteran satisfaction, quality of life, health status, etc.

The long-term goals would be to establish innovative care strategies, using alternative medicine approaches, other ideas, develop small pilots that would lead to random controlled trials, and essentially, move toward a program of quality health services related research.

The next group was the pharmacological group. That was headed by Dr. Dan Clauw, with the

assistance of Drs. Victor Gordan and myself. The first idea, and we of course, fleshed this out in significant detail in our document, is to test symptom-based treatments, pain, cognitive symptoms, and that's the sort of, short-term. In other words, what we can do is develop algorithms for trials that can be started, essentially, yesterday. Another issue would be to examine the role of neurally-mediated cardiovascular changes and symptoms with drugs such as calcium channel blockers and other fluid expanders. In the longer-term treatment ideas, because now we would have to set up appropriate double-blinded trials, examine the role of subclinical adrenal and thyroid abnormalities vis a vis therapeutic trials with very low-dose hydrocortisone or thyroxin. And then, finally, consider trials of nutritional supplements or vitamins. Again, in a longer-term view.

The last group that we split into, was one that focused on the issue toxic exposures and intolerances. That group was led by Bill Meggs, with input from Mary Lamielle and Dr. Kris Dahl. So here, the issues were, the goals were, to first of all bring about detoxification, to test for intolerances to inhalants, foods and drugs, and look at the role of avoiding them, and lastly, to do drug elimination trials in veterans with poly-pharmacy, for their symptoms. The short-term approach would be immediate implementation to achieve the goals that I just laid out for you above, and to utilize existing clinics as appropriate, either as training sites for personnel that could bring these methods to their own sites, or putting veterans through these treatments, on-site. Then, develop a way of assessing efficacy in a tiered way. So, in other words, the simplest assessment of efficacy would be really just pre-post measurements, again, quality of life, symptoms, etc. and comparing the pre-post data to a wait list control of individuals who had to wait because of work are unavailable to go for treatment. So, that would give you some efficacy data, and then, build in more and more stringent controls. One might be to evaluate veterans using personnel who don't know whether the veteran was treated or not, and then certainly for the spa treatment and exercise treatment idea, another more stringent control yet, would be to use the temperature of the actual thermal box as a variable, where it would be high in the group in which efficacy is expected, and lower in the control group. So that's what the subpanel means by a tiered way.

Finally, in terms of the long-term, based on the data of the more stringent trials, expand availability, and finally, we also concluded that one or more of these environmental control units would be needed for research and treatment. Thank you.

Dr. Drue Barrett, Moderator

I think we have time for maybe one or two questions if we can, so we want to make sure we hear from the prevention group. So, let's take these two questions..

***Gwen Diehl
Member, Illinois Persian Gulf War Disease Commission
Springfield, Illinois***

I retired from the Army as a Sargent, First Class, from the regular Army. I served 20 years and did six months in the Gulf. I'm here representing the Illinois Department of Veteran Affairs, Persian Gulf Task Force for Illinois, and I'm also the AmVets Persian Gulf representative for the state of Illinois. I would like to demand, as an immediate outcome of this conference, that we have the symptoms and diagnoses of any one or more of the specific illnesses that we discussed here be acknowledged for we, the military and the civilians who served in the Gulf or support areas, that we may be given the presumed assumption of Gulf War exposure, and therefore, service connection, as recognized by the CDC and the NIH, so that we could be treated by the VA now.

Dr. Drue Barrett, Moderator

Thank you for your comments.

*Lawrence A. Bradley, PhD
Professor of Medicine
Division of Chemical Immunology & Rheumatology
University of Alabama at Birmingham
Birmingham, Alabama*

Just a quick suggestion. I would encourage the panel to consider recommending that investigators use both tests of clinical significance as well as statistical significance in order to determine the strength of the effects of the treatments which are being studied. Thank you.

Dr. Drue Barrett, Moderator

Thank you. Let's move on to the prevention group. Dr. Melissa McDiarmid will report on that group's recommendations.

Melissa McDiarmid, MD, MPH
Assistant Professor of Medicine, University of Maryland
Director, VA Depleted Uranium Program
Occupational Health Project
Baltimore, Maryland

Like my colleagues, I can't begin without thanking everybody involved in this effort, both those that sat at the table and those that followed us through the whole three-day process. I think you will see contributions that I'm going to show here came from everybody involved and I heartily thank them. I especially need to thank Drs. Donna Dean and Tim Tinker, who took care of our entire group and of me, especially, and we couldn't have accomplished this without them, and I want to acknowledge that. Well, we did prevention, and in some ways, it's hard to be against prevention, so perhaps our job was a little bit easier. It sounds like there was a little bit more agreement in our group than some of the other groups that struggled in trying to come up with something that was meaningful in terms of research recommendations as a result of this process.

There were about four bullets that were pretty generic that were tasked to our group, and we ended up combining those and saying that we thought this was our task. That was to look at the prevention of and preparedness against chemical exposures, although we ended up expanding or enlarging that a little bit, because there certainly are other toxicants involved besides just chemicals. Like one of the other groups, we had some key messages, some up front broad brush issues that we want to communicate to you all and have represent our work, and then we're going to go into some details. The first was that, perhaps some of you thought that, "Well, how do you actually do prevention research?" And I'm sure some people have given their whole lives to that and are having chest pain right now, but it maybe sounds that our task was not as clear as some of the other groups in terms of what's possible. But we want to first communicate how we see some really clear prevention research destinations that we could recommend.

One is clearly to evaluate effectiveness and evidence of what has already been done in ways that would include what has worked, what has not worked, in other words, outcome, research, lessons learned, best practices, and evaluation research, generally. So, we think there's much to be done in a research framework having to do with prevention. We wanted to say that we think first, to look at what has already been done. It's not like we're having this meeting in 1992 where nothing's been done. In fact, there are a lot of interventions already in place, and before we start re-inventing the wheel, it would be good to see what has come of work that's already been done. So we thought that would be a good place to start. In terms of priority setting or short-term, long-term, it seems like these are things you would want to do first, from a short-term point of view.

The second key message is to assess other exemplary national and international models of

prevention strategies and outcomes. One of the things we are stymied by, as people in public health generally, is our lack of record linkage. And we had, in our group, colleagues from other countries. The U.K. is represented and Canada, and they have a little bit easier go of it because they are able to do record linkage. And so, one of the things that we want to do or at least say, because we have a forum to say it at this point is, that this might be an opportunity for us to recommend in a forum, perhaps larger than this one, that there are other good ways to do the types of research we're being charged to do, vis a vis, health outcomes, and that other countries have achieved some basic structural record linkage and medical record linkage possibilities that allow epidemiologic studies to be done that we really can't even start to do here until we address that fully.

The third other big message is ways to do prevention research. One would be to identify data gaps, and there are data gaps. We've seen that in other groups. But there are gaps in terms of prevention research, as well. Then, to assess effectiveness of prevention strategies. One of the ways that we would do that is to divide or stratify effectiveness in terms both of content and process end points. One of the examples that was given by the group in terms of content, and something that's clearly a prevention strategy, would be vaccines. And there was both basic science-type research to be done in the way that we do vaccinations, formulate vaccinations, group vaccines, look at other potential issues involving vaccine protocols and such that was recommended, and that shows that you don't just have to do outcomes-type research, but there's true discovery scholarship that can be done vis a vis, prevention.

Now, what guided us, on Sunday evening we saw this very daunting charge. One of the things we also wanted to do, in addition to getting the issues that were near and dear to the hearts of everybody in the group, was to have some way of prioritizing what was important, especially if we got into some areas of disagreement, which we really didn't, but in order for this not to just be a laundry list of those who were at the table, or indeed, in the room, we wanted to use some principles, instead of opinions, to guide what we wanted to bring forward to the larger group. One of the things that we did was use classical public health principles in priority setting. We basically recalled this, and reminded ourselves of it before we started every meeting, to try to keep some order and keep us from getting in disarray. To remind us all of what those are, one of the things that we like to do is look at what the severity of the hazard is that we're dealing with. We like to look at the number of people that are exposed or potentially exposed. We like to think about the availability of interventions, feasibility, technically, perhaps, economically. And we like to look at what are the chances for success with existing interventions. So, that helps order the way we think about and thought about prioritizing what we would recommend.

The other way I think of interventions, being from the occupational side of the house, is to look at problems and interventions and fixes, if you will, from using the classical industrial hygiene hierarchy of control technologies. I think a generic message that came up in our group, and I would share here is that, although this is a very complicated problem, and complicated

additionally by the fact that perhaps we're a number of years late in addressing this, there sometimes is a mistaken notion that this is a new problem or a new set of problems and that we never had to think about this before. But those of us in the occupational and environmental health community see this challenge in general as something that we kind of do every day. There are tools that are available, and there are people who think this way about other types of problems and find this paradigm, this way to think about interventions in occupational settings, that we think this fits. And I'm sort of happy to see that over the years, the number of folks that have been involved in this area of Gulf War illness largely have come from the occupational and environmental health community, and I think that we have something to offer. The good news is that we don't have to invent an approach or invent a discipline, that indeed there is, already in place, a way to think about moving through this very challenging problem.

And so, I put this hierarchy of controls strategy out for the group at our first meeting, and thought that could guide us. What's important about a hierarchy is that it's not just a list, but it's a list in a certain order, and as I tell my students, the order matters. We start at the top of the list and we go to the bottom of the list, and you exhaust or use various strategies starting at the top of the list, and to the extent that you can't fully protect, or protect as much as you would like to be able to protect, the group that you are trying to protect, you move to the next level. So, the order matters, and in some ways that assists in prioritization and maybe can assist those people that we hand this off to. That will be the planners, or the people that decide to field or write requests for proposals for what we're going to hand over. So, this might guide them as well.

We are going to now move through each of the big five items here that are classical elements of the hierarchy, and we have specific examples that are key to each of those. In occupational health, we always start with substitution, because obviously, you can avoid all other work if you can substitute or eliminate or protect the worker, the service person, from exposure to certain hazardous toxicants. So, we put some of the usual things we think about vis a vis, substitution, up here. Identifying less toxic substances, but to also not failing to think about the interactive effects. We've heard a lot about concerns about mixed exposures and such. A specific example was to suggest that we restrict the number of pesticides that were in use. This might help in terms of looking at exposure histories or reconstructing exposures if the list is shorter, rather than longer, that might help in terms of, as I said before, reconstructing what happened. Again, the vaccine example came up, optimizing vaccine potency, formulation, dose and duration. There might be better ways of using that prevention strategy and minimizing concerns about potentially negative effects from taking part in vaccinations.

Engineering controls is something we apply when we can't substitute or remove the hazard, and here, we actually try to have a physical barrier, an engineering barrier that protects the worker. It takes them out of harm's way, protects the service member and it's something that's physical. It's a design, that doesn't ask the potentially exposed person to do something right, and supposedly means there is a built-in presumption of protection because the situation itself is

engineered to engineer out the hazard. We had the hardest trouble with this, because in some ways, I guess, the unique nature of especially military operations, makes this a little tough. On the other hand, pre-thinking, pre-planning in design of equipment, in terms of weapon systems, can help this. The way things are actually put in blueprints, the way things are designed, built, those sorts of things, to at least have that in the minds of the designers. An easier example was containment materials for transport of certain contaminated material or other hazardous material. The example given here was how the contaminated tanks that were involved in friendly fire that were contaminated with DU, how they were contained and packaged, if you will, for shipment back here.

We then went to some administrative controls and divided these into a number of areas and had a lot of expertise on the panel and in the room, in terms of health educators, risk communicating people, so we have a very long list for this. We tried to collapse and put similar ideas together. Identifying and segmenting key audiences was the first issue, and to think larger than just key audiences being the service person themselves. I think, reflecting some of the comments that came in our larger meetings during the last couple of days, is that there's bigger audiences than just the service member which would include family members and other, perhaps downstream, potentially affected people. That would affect decision-makers like commanders, who, while they may have to make strategic decisions, need to make an informed strategic decision, such as if there are going to be trade-offs from an exposure point of view and a kind of military strategic point of view. What the appropriate instructional strategies for communicating in health education situations are, and identifying barriers to understanding the importance and impact of health education messages on readiness? Now again, this is all within a framework of research, but we already know, theoretically, some of this information was supposed to be being communicated, was supposed to have been communicated in 1990 and 1991, and there were clearly some problems.

So there is, I think, a very legitimate role for prevention research in identifying barriers to identify what went wrong or what didn't get communicated. We were also told by some of the military colleagues to communicate in language that the military understands. Channels. That's how you want to deliver the information. Those are the avenues that you would use to deliver information. One of the very good examples here, we heard it both in small groups and in larger groups, is including reproductive health issues as one of the content areas where risk messages and information has to be enlarged. Identifying multiple audiences, we talked about before, beyond just the service member who need to get information and what types of information sources are good and credible to the specific audiences that we're dealing with. Next, assessing communication of scientific uncertainty and technical information. This is really tough because we would all like this to be a perfect world where everything can be assured and any information that we communicate can be repeatable and verifiable and indeed the same experience from person to person, and that's not really the case, so we have to somehow include the wrestling that we all do with issues of uncertainty, when we share this information with others.

Assessing comprehension, utility, and value of risk information, that is important. A lot of times, and one of the things my risk information colleagues had to teach me was, especially those of us who come from the science side of the house, think that information is the most important thing. All you have to do is have access to the information and everything else becomes crystal clear. I think I learned the hard way that that is not the case. But that is also why I am one of the big, fervent believers in risk communication.

Identifying methods to communicate comparative risk, that came up a lot too. Some of us are sometimes, I think, frustrated that folks seem to be worried about the wrong thing, that indeed, there are a lot of things to be worried about, but those of us who are occ. docs or clinical toxicologists, would have probably order the things that some of you are worried about in a little bit different order, and there comes this issue of comparative risk. Also what comes in here are things that people choose to do themselves that are of equal risk, or sometimes more profound risk. For example, cigarette smoking. So, there has to be a piece in there about that, as well.

Next, we're going to include a group of issues under surveillance in general, and we're putting surveillance under the larger element still, of administrative controls, and the first is environmental surveillance. This would be looking at the ambient environment, characterizing the ambient environment. We need to develop enhanced instrumentation for nuclear, biological, chemical and other environmental exposure assessment. So, it would be good if the chemical alarms would go off only when there was a chemical at a concentration that would really do harm. That would be good. That's not what happened, I hear. So that's a good example. Establish exposure limits that take into account, multiple operating environments. That's kind of a mouthful. What that means is, that right now, in occupational health, we have exposure limits. The reason we do environmental sampling and try to characterize the environment is so that we can determine what's safe and for what duration of time it's safe for people to be present, say, if we're talking about an air contaminant. Well, those are largely based on occupational settings, which are usually based on an eight hour a day, forty hour a week, exposure. The acceptable exposure limit concentration probably needs to be a little more fluid and needs to be tweaked, if you will, on the high end and on the low end. In a military situation, or what you call operating environments, if somebody is shooting at you, then probably we are a little less concerned about a certain exposure concentration in the air. However, if you are stateside, and there shouldn't be any good explanation for a competing reason for there not to be a focus on environmental exposure for military workers or civilian workers in the military. For example, there shouldn't be any less attention to what a safe exposure limit is when there isn't another competing issue like somebody shooting at you. So we think we need to look at exposure limits, sort of, across the gamut of operating environments in the military to adjust and assess that, and that's another research end point. Then, characterizing the environment of deployment. That's, I think, a very tall order but something that needs to be done. And approaches to how you do that. Not just doing it, but approaches to how you do it, and again that's a research issue, because it's not as if we already clearly know how to do it, or know how to do it in an efficacious and protective way.

Still under surveillance, let's look at medical surveillance. We put biomonitoring there, because that's, for some of us, an element of medical surveillance. To develop a data gathering tool, this is medical surveillance generically. One of the things that people forget to do, and I tell my students all the time, is that sometimes the very best information that we get is from taking a history. The physicians were taught to talk to their patients – they'll tell you what's wrong with them. So we need to get that information and write it down. So, the first issue would be the data gathering tool, and by that, we mean the questionnaire or the information we do gather, that spans the life of the service member and that accompanies the person from the DoD, to VA, to civilian life and that needs to be linked both with exposure and health outcome. That sounds pretty basic, but as those of you know who take care of these folks, it doesn't exist. We can't sometimes even jump that first fence between DoD and VA. In terms of picking something easier to do, that might be a little easier to do than having the information somehow accompany that person into civilian life, but there was also a plea to have that linked with exposure data and that's sort of pie-in-the-sky on the one hand, but that is what's needed to be done to go forward.

Next, validating self-reported environmental exposures. There was a Canadian example of this. I for one think that at a minimum, the way we ask questions about exposure to environmental toxicants needs to be tweaked, both on the first CCEP exam questionnaire, and also on the VA questionnaire. If you look at the way the questions are phrased, they are not helpful. It's, "Were you ever . . ." That does not help any of us really try to retrospectively put together an exposure assessment or get a good feeling. I don't want to know were you just exposed to DU, which is what the question was. I want to know how you were, for how long, why do you think you were, was it 50 kilometers from an smoldering tank, etc. That may sound like an impossible piece of information to gather, except one-on-one, and it's not. There can be some very basic tweaking to those tools if somebody in our field would be given a shot to be able to do it.

Develop an effective prospective surveillance from multiple end points. Again, "prospective" is a word near and dear to a lot of our hearts, and that's not exactly happening right now. But this goes to ways of following and tracking people who have not yet developed an end point of concern, be that a reproductive abnormality, a cancer, whatever. How are we going to follow people forward?

Two more elements here. Developing a method of surveillance for low-level exposure. We were told to do that. It came up a number of times. Somebody wanted a case definition and I thought we were going to not get anywhere if we stopped there, but we do want to say, we think it needs to be done, but obviously, we would need to define what low-level exposure is. I think probably it would depend on the toxicant that we're talking about, so I don't know that we could make this generic sweeping statement, but I think that it goes on the list of types of research that needs to be done.

Developing methods for archiving biologic specimens. It would be nice if people could go to the

freezer and get out something that got put there in 1990, so that we could compare it to excursions for any types of end points we're looking for now in various biologic specimens. That's being done in other high risk occupational groups and in other groups that are high risk in development of certain types of disease, and it's not a bad idea to think about here.

Finally, work Practices, well almost finally, second to last. Evaluating existing health hazard protocols and developing metrics to compare work practice risk. So this gets to an evaluation end point again, but we think we do things right. And I know sometimes the occupational health people, the IH people, the safety people, think everything is under control because we wrote a really good program, but as written, as built, as done out there is not exactly the same, amazingly, and that we need to look at ways of assessing the efficacy, the value of these things, and how to measure it. It would be nice if it could be not just a good/bad, but ways of really looking at metrics of evaluating these.

Exploring impact on negative health outcomes of varied work organization structures. I thought this was really helpful. The example that was given here was that in this last conflict, more reservists and National Guard folks were fielded than in previous conflicts, and that the issue becomes how you meld or blend the full-time military with other folks that are, sort of, dropped in. Did they get organized alongside full-time people, or are there separate units that are full-time and separate that are the part-time military? In occupational health, we'd call that a work organization issue, and that might be a focus or a partial explanation for certain issues and situations. Clearly, I think it needs to be looked at.

Developing audit and investigation systems to insure implementation of management control and efficiencies. That sounds like a lot of words again, but one of the requests was a good recommendation, that there needs to be an overarching thought given to safety and health management in civilian life. This would be called comprehensive safety and health plans. If you do that, you have to have a built-in audit or outcome assessment piece to that. It also says that it would be the first thing you would think about before you ever started at the hierarchy of controls. To think about, sort of, the management, not just the elements which are the bricks, those are the individual pieces of the hierarchy that I talked about, but as I say to folks, the cement between the bricks is the piece that's often missing, and yet, the wall won't stay together. So I think that comprehensive approach, and then, including audit and outcome measures is extremely important.

Last, from the hierarchy, is PPE. We think there's some easily doable recommendations here. First, again, it's a research focus, to design protective clothing that's durable, viable, ergonomically flexible. Some of this already exists, so I think one of the issues would be for the military to start looking at other areas of existing expertise, like NFPA and such, who've got very good chemical protective clothing. It's just that sometimes that doesn't get transported or used, I don't know if it's a turf issue or what in the military. I'm not being flippant. I am saying this is a

place where we can succeed quickly because some of these things exist. One of the vets in the audience said that the current chemical suits comes in three pieces and involves three zippers. That doesn't make sense, emergently, so I would say this is another area where if we picked the lowest hanging fruit first, this would be one area. Another that a couple of us felt very fervently about was, with regard to respiratory protection, developing and validating data standards for PPE compliance that strive to adhere to existing regulatory standards. That's a mouthful and what it really means is, the military needs to start using respirators that go through the same type of evaluation process as the private sector. Right now, the military do not use respirators that subject themselves to a trip to Morgantown to have NIOSH and MSHA have at them, and that's been a problem in my professional life at OSHA, and I think, elsewhere. Maybe there are situations with extenuating circumstances and you can't do some things when somebody's shooting at you. But there's a lot of times when somebody's not shooting at you, and the military's still not using the same respirators and the same types of classical, good occupational health practice with regard to PPE, and there should be no place to hide with regard to that. And again, I think that's low hanging fruit.

So, in terms of prioritizing, I've been kind of telling you about the ones we felt. I asked people to tell me what they felt passionate about, because I didn't want to go back through all of those issues, and we only had about thirty seconds, so these are the ones that hit the "I feel passionately about" recommendations: assessment of what has already been done since 1991; comprehensive safety and health management program, in other words, just get the military on the same level as the civilian life in terms of how we manage safety, health and security in a military work environment; metrics for implementation and effectiveness, I think that's an absolutely legitimate area for prevention research; PPE; and vaccine efficacy and safety. I think I'm going to stop there. Thanks.

Dr. Drue Barrett, Moderator

Alright. First I want to make a quick comment. There are evaluation forms in your folders. If you can fill these out and drop them either in the back of the room or in the registration area, that would help us in evaluating how useful this was for you. We will take a few comments and then, I'm sure all of you are interested in knowing the next steps, so Dr. Falk will conclude with discussing what the next steps will be from here.

***LTC. Charles C. Engel, Jr., MD, MPH
Chief, Gulf War Health Center
Walter Reed Army Medical Center
Washington, D.C.***

One issue that I think should be addressed around surveillance is privacy of the data. I feel like there should be an organized effort to attend to issues that pertain to privacy of the data, and

there are a couple of issues related to that. One is a way of managing the data that would allow both DoD and VA to effectively use the data for various purposes, while at the same time, preserving the privacy of the data. The second area of concern is as it pertains to self-report data. If there is not adequate privacy of the data, I think it will compromise the validity of the data. So, these are issues that I've thought about in conjunction with others recently, and I would like to ensure that those are attended to.

Victor Silvester
President
Operation Desert Shield/Storm Association (ODSSA)
Odessa, Texas

I'd just like to take a minute to say to each and every one of the researchers out here, thank you for being here, thank you Drue, for putting this on. This has been a major learning curve for the veterans. This is one of the first programs we've been allowed to actively participate in. I want to thank each and every one of you. I just want to make one comment. This has been a major learning curve. We have to remember that some of the things that you folks talk about all the time, i.e., the statements about bullets. Bullets to you mean one thing, bullets to a veteran mean something else. If you're going to tell a guy, okay, we're going to give this veteran a bullet, because it's an important part, some of us understand that that's a major note. But when you tell the veteran that you're going to give him a bullet, you just told him you're going to shoot him in the head. Okay?

The ideas that I've heard in this program, I think, are excellent. What we need, and most people that work, particularly the officers, those who have served as officers in the corps know that if you want to get something done in the military, which is a major body with the enlisted personnel who carry the fight, the officers turn it over to the NCO's and let the NCO's handle it. My statement here folks, is if you truly want to do something for the veterans and you want to get the veteran community, the major portion of which are enlisted, then get your NCO's involved, because we can make it happen for you.

I appreciate the effort that each and every one of you have put in, we've seen some ideas, some of us agree with what you've said, some of us don't. The important part is, there was a major channel of communication open today between the veterans and the resource community, and I personally thank each and every one of you.

Wendy Wendler, MBA
National Board, Special Projects
Desert Storm Justice Foundation
Dallas, Texas

We wanted to make a brief insight about what we call the “body count,” the accounting of the wartime dead and the post-war deceased. We’ve been using that number for ceremonial occasions and congressional briefings and media background information for several years. We obtained it through the auspices of the Persian Gulf Coordinating Board. It seems a rather straightforward procedure. There is a list from the DoD of 700,000 deployed. VA balances it off the list of social security deceased at any ongoing time. It’s something that you can monthly, quarterly, annually update. In 1996 and 1997, I’m doing these dates from memory, but the number that I have is accurate, we took the May 1996, Memorial Day count was 4,291. By the time Dr. Rostker brought the DoD dog-and-pony show to Dallas in April, 1997, he personally told us it exceeded 6,000. At one point in our information outreach, the death count had risen 67% in about six months. This may come in surges as the Agent Orange outcomes did for Vietnam veterans, with which I’m familiar. There would be 5-10 years for testicular cancers, 10 years for lymphomas, 20 years for prostate cancers. I would urge all governmental agencies, congressional offices, and advocate agencies to just adopt this as a routine information request. I’d like to ask you to aid us in updating a basic process and to utilize it appropriately to not only study, but honor, our warriors.

***Gina Whitcomb
Board Chair and Executive Director
Desert Storm Justice Foundation
Guthrie, Texas***

I’ll just take a couple of seconds. I know we’re running late. We were going to do this last night and it got late, we were all visiting and started leaving. But I can’t recognize everybody we appreciate in this forum, but there are some key individuals who have made such a big difference and a lot of contributions and have been very supportive, so I’m just going to run down the names. We have gifts for them and this is new merchandise from the Army-Navy store. It’s not anything from the Gulf, I promise. Of course, Congressman Sanders, we all know how supportive he was, I wish he was still here. General Edwards, of course, his strong right arm. Dr. Barrett and her wonderful planning of this. Dr. Claudia Miller, Dr. Baumzweiger, Dr. Root, Dr. Doug Rokke, we couldn’t do without Doug. Dr. Haley and Dr. Petty in Dallas. Dr. Korenyi-Both, and Andrea and Michelle who had to do with Visions and the Crowne Plaza and all they did for us. Phil Talboy, what could be done last night at the veterans’ forum without Phil? I mean, he was terrific. Major Denise Nichols of course, always there for us. And I don’t know how many of you realize that Kirt Love and Venus Hammack have just worked themselves to death videotaping all of this for us. And our very, very special thanks to Dr. Ruth McGill. She’s our special angel. Without her, there’s a bunch of us who wouldn’t have been here. Thank you very much.

***Anthony Hardie
Constituent Liaison, Veterans’ Affairs***

***Office of US Representative Tammy Baldwin
2nd District of Wisconsin
Madison, Wisconsin***

First, I'd like to say thank you to all of the researchers that participated, to all the veterans who have managed to survive these last three days, which have been very long days. You can see by the few amount of veterans in the room that this has been a pretty difficult morning for many of us. I'd also like to charge the researchers here in the room that, when you leave today, we're going back to our lives, and we're waiting on your research, and what you accomplish following this meeting is going to affect each one of us in a very significant way. And with that, I have four questions and one comment.

I think that we saw, throughout this, the process was excellent, that we had veterans involved at every stage of the process. I think it was evident in the report from the various workgroups that integrated the veterans the most effectively, had exceptionally effective resolutions and recommendations. The four questions that I have will probably lead into Dr. Falk's comments, but: What happens from here? Who decides what happens from here? When will implementation begin? And how will veterans know when all this has begun? Thank you.

***James Cone, MD, MPH
Acting Chief, Occupational Health Branch
California Department of Health Services
Oakland, California***

I just wanted to put forward another structure for thinking about the results of this Conference. One is the traditional concept of primary prevention, secondary prevention and tertiary prevention. And, unfortunately, what we had to discuss here today were secondary and tertiary prevention, namely diagnosis and treatment and treatment of disability when someone is injured or ill. Unfortunately, we have not had much discussion of primary prevention, and what we really need to think about is how do we prevent war in the first place, and then, how do we more effectively deal with the question of export of weapons of mass destruction? I think our country is the leading supplier of the world for ingredients which are going to be used in future conflicts and they're going to be used against our own troops. So I think we need to add that to our list. Prevention is really where the payoff is, and unfortunately, we're left with secondary and tertiary prevention in this current situation.

Ms. Denise Nichols

I want to thank each of the panel members and working groups also. I want to thank everyone who has stood by the veterans. Some of you, I met at the NIH back in '94, and you're here again supporting us. Dr. Robert Haynes, who I think has already left, there's just so many, I couldn't

name them all. But I do want to get a few things into the record. I mentioned them at the treatment session, wanted serious consideration to pull in experts on hyperbaric oxygenation to see if that would be a treatment potential for us. Plasmapheresis was used on one of our vets, Colonel Herb Smith, it saved his life. We have to consider that. We have to look at the immune system, and I didn't see that coming out clearly. What I saw, from early on, was neurological and immunological damage. And when I summarized it to people, I said, "When you get those two, you get every system in your body." We have civilians involved who are not getting care, they're really left out in the cold. We need to get them urgently into any military hospital to get care. I have been given the number 4,000. We want that done immediately. The other thing I've brought up for five years, is some type of emergency financial assistance. It's taking too long to get these claims through the VA. We have families falling apart. Our divorce rate, I don't even know what it is now, but I've watched them, fall, stumble, go through marriages, and part of that is, you have to look at the body as a whole body – that is, emotion, spirit, physical being, mental being – we are a whole body concept. That includes stressors that we have faced, including financial devastation on these families. We need to activate FEMA out there to get help to the veterans. It's been too long coming.

I would encourage every VA doctor here, and please pass the word, if you start doing a good, thorough neurological exam that is written up in every physical assessment book, I was taught it as a nurse, you'll find a lot of things that will make you sit and think. We were up stairs doing physical exams last night. We were working after other people went away. And for sick vets, we've struggled through this conference. You don't know all the behind the scenes action. But when you do a simple, complete, neurological exam – standing/sitting pulse, checking the vision, peripheral neuropathies – it's heartbreaking to see this. To each of these, in the medical field, over there and here, we cannot take any more delays. This is an urgent, critical, lifesaving situation we're in.

We need our bills out of the Justice Department. Some of us worked very, very hard to get bills into legislation. We got them through. It was a battle on the Hill, another war that we had to go through, and I was up there many hours, and a lot of other people, and a lot of people were on the phones. Our bills were sent over to the Justice Department, by the VA, on December 8th. Get them out of the Justice Department. Use this forum. Let's move. Let's cut through all the bureaucracy. Let's make this work this time.

Family support is very important. Our wives, or widows and widowers, they've been left out there. We need to bring them in, we need to go out and find them out of their bunkers and bring them home. Please bring us all home, now. I think this was a good start but we are hearing from vets, I'm a nurse, I can understand the process that we have to go through scientifically, because I do have a master's degree, but I was also critical care. I was out there on the front lines with the Mobile Air Medical Staging facility, and I told Senator Carey once, some of you know his background, I said, "It's like, we're out there on the battlefield. I've gathered up the injured and

I'm calling for my dust-off. I'm calling for my 1-30 Air Evac, and somehow the radio communication's not working." I think you all are hearing us now, I've seen some dramatic changes and I want to compliment you all for listening to each of the veterans, but let's make it go fast. Thank you.

Dr. Drue Barrett, Moderator

Thank you. Let's now discuss some of the next steps. I'd like to introduce Dr. Henry Falk. He's the director of the Division of Environmental Hazards and Health Effects within the National Center of Environmental Health at CDC.

Henry Falk, MD

Director

Division of Environmental Health Hazards & Health Effects

National Center for Environmental Health

Centers for Disease Control and Prevention

Atlanta, Georgia

I would like to thank you all for participating in this meeting. It's actually a sign of all the energy at this meeting that we're running late, as you know. But I see so many of you here and I see many of you paying very close attention, even at this hour. So, we very much appreciate everybody's active involvement in the conference. The title of my portion here, is called *Closing Remarks*. I actually don't like that title because it implies a certain amount of ending and finality, which is not the impression that we want to convey. So, let's just call this *Continuing Remarks* and go on. I'll try to be brief, given the hour, but there are a number of things I want to convey, and they go into three headings: The first is in "thank you's," the second is in some reflections on the meeting, and the third is in where we are going.

In terms of the thank you's, there have been several lists already, but from my perspective, we want to thank the veterans who came here and participated so actively in the meeting. I hope it has been beneficial. I've got the list of quotes that I am remembering from veterans such as - "We need our health back, "This is real," "Shoot straight," and "Keep us involved."

We will try to live up to that. I want to thank the scientists who were here, and I know before the meeting, there were concerns on both ends, from veterans and from scientists as to what the level of interaction would be, but I think that the scientists who were here who participated and spoke very well, I want to thank them. All of the government representatives who were here from HHS, VA, and DoD, advocates from various groups, the planning committee, the working groups, the chairmen and everyone who participated, I just wanted to say our thanks.

Let me say that our idea in doing this is that we were not expecting a single answer from this

meeting. Our whole approach to this conference has been to get ideas out on the table and to stimulate thinking and stimulate getting ideas here. We didn't intend, nor was it our charge, to select a single magic bullet. And I think we had a lot of good ideas, and I think that thinking is what will propel us forward over the coming months in terms of finalizing what we do. We see our role at HHS as very much of a catalyst. We'd like to help make things happen, both by bringing people together and by getting good ideas out on the table, and then by following through so that we get results from all of the ideas that have come forward. So we will continue in that vein. I think that in terms of environmental health, health people like us can ultimately never fully accomplish things on our own. We work with people at HUD and VA and a whole series of other agencies, and our goal, I think is to catalyze activities and enable joint activities to happen, so, we will continue doing that.

Our process, to this point, has been the small planning group which has worked closely with a broader planning committee, and received input from a wide variety of groups and providing materials to you along the way and getting feedback. We'd like to proceed in the next several months in exactly the same vein, so, the smaller executive planning group will shortly, and I think, within the next several weeks, outline a timetable for the next several months, which we will provide to all of you. We will also seek your input at several points along the way, in terms of reviewing the broader outlines of what we want to do, as well as reviewing the draft materials, as it goes along. So, expect to hear from us in about three weeks, and then we will, as I said, seek your review and comments along the way.

Our specific goal in this has been to come out of the conference with a research agenda. I think we have a lot of materials to work with from the workgroups and from the transcripts. It nevertheless takes time to shape that into something that we all feel is capturing the spirit of what we want to do, the many details of what we wanted, and will have the broader appeal, momentum to move forward. That is our direct charge here. There were comments about the process, and I think we need to think about that over the next several months, but I think we, and this involves all of you as well as ourselves, need to think about how to take this research agenda – and how individuals, Congressman Sanders, the agencies, and other individuals – to move forward with that. So, we would like to set this up in such a way that this will be an outline and a specific set of recommendations that everyone could move forward with. I think for all of us, there's a real need to stay focused. I think we had a really good meeting, but we need to be smart and persistent and caring and very thoughtful in how we go forward with this, and hope that this conference will not just be a memory, but will be a start of a process which will benefit all of us. With that, I want to thank you again for all of your participation. Drue.

Dr. Drue Barrett, Moderator

I don't have any further comments. Again, I want to thank you all for coming. I know it's getting late and some of you have planes to catch, so why don't we stop here. Thank you very

much.

The session adjourned.

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